

CLAIMS

I claim:

1. An handling system for vegetables with a root portion and a leafy portion, the orientation system comprising a pair of counter-rotating rollers, at least one of said rollers comprising a spiral on its outer surface adapted to move the vegetable along said pair in a direction parallel to the rollers, and at least one of said rollers comprising a member adapted to engage and pull the leafy portion down between said rollers while said root portion remains above said rollers.

2. The handling system of Claim 1, further comprising a cutting mechanism positioned to receive the vegetable from said pair of rollers and comprising at least one blade adapted to sever said leafy portion from the vegetable.

3. The handling system of Claim 2, wherein said rollers are horizontal and said blade is horizontal, so that said pair of rollers ejects the vegetable past said blade.

4. The handling system of Claim 2, wherein said rollers are horizontal and wherein said cutting mechanism comprises a plurality of circular, horizontal blades, wherein wherein said rollers ejects the vegetable horizontally past said circular blades

5. The handling system of Claim 1, wherein said spiral is a rigid coil on said outer surface.

6. The handling system of Claim 1, wherein said member comprises a plurality of flexible protrusions extending generally radially out from said at least one roller.

7. The handling system of Claim 6, wherein said flexible protrusions extend from a strip wound around said at least one roller.

8. The handling system of Claim 1, further comprising a dividing mechanism for directing a plurality of said vegetables to fall on said pair of rollers in a row parallel to said pair of rollers.

9. The handling system of Claim 8, wherein said dividing mechanism comprises a plurality of freely-rotating rollers positioned above and parallel to said pair of rollers.

10. The handling system of Claim 1, wherein the rollers of the pair are parallel and separated from each other to create a gap between the rollers, and wherein each of said rollers of the pair comprises a member adapted to engage and pull the leafy portion down through the gap and to a position between and below said rollers while said root portion remains above said rollers.

11. A vegetable harvester and leaf topper comprising:
a wheeled vehicle;
a vegetable collection apparatus for introducing into the harvester uprooted vegetables from a field;
an orientation station having a plurality of counter-rotating orientation roller pairs, each orientation roller pair having a first orientation roller and an adjacent second orientation roller, the first orientation roller including a first elastomeric finger strip and the second orientation roller including a second elastomeric finger strip and a vegetable advancing member;
a cutting station receiving vegetables from said orientation station, said cutting station having a cutting member for removing vegetable leaf tops from the vegetables;
a vegetable transfer system receiving topped vegetables from said cutting station for conveying off of the harvester and leaf topper.

12. A vegetable harvester and leaf topper according to Claim 11, further comprising a separation device comprising a plurality of transition rollers disposed perpendicular to the direction of travel of the harvester and adapted to feed vegetables onto the orientation station, and divider rollers disposed parallel to the direction of travel between each of said roller pairs and adapted to deflect vegetables toward a vertical central plane between the rollers of each pair.

13. A vegetable harvester and leaf topper according to Claim 11 wherein:
the first and second orientation rollers are cylindrical, and each having a diameter, a length and an axis;
the axes of said orientation rollers have a parallel relationship and are generally aligned with the direction of travel of the harvester;
the first and second orientation rollers of each orientation roller pair further have a spaced apart relationship with each other; and
the first and second orientation rollers of each orientation roller pair counter-rotate with respect to each other.

14. A vegetable harvester and leaf topper according to Claim 11 wherein:

the first elastomeric finger strip is spiral-wrapped around each first orientation roller over its length;

the second elastomeric finger strip is spiral-wrapped around each second orientation roller over its length such that it is in continuous and cooperating contact with the first elastomeric strip along the length of the orientation rollers while they are counter-rotating with respect to each other; and

the advancing member is spiral-wrapped immediately adjacent to the second finger strip over the length of the second orientation roller of each orientation roller pair.

15. A vegetable harvester and leaf topper according to Claim 11 wherein the first and second finger strips have a plurality of protruding finger-like appendages extending outwardly from and perpendicular to the axes of said orientation rollers, said finger-like appendages of each first orientation roller intermeshing and cooperating with the finger-like appendages on the adjacent second orientation roller.

16. A vegetable harvester and leaf topper according to Claim 13 wherein said spaced apart relationship is adjustable.

17. A vegetable harvester and leaf topper according to Claim 11 wherein said cutting station for removing vegetable leaf tops comprises a plurality of rotating grabbing and cutting disks.

18. A vegetable harvester and leaf topper according to Claim 11 wherein said cutting station comprises a first grabbing disk, a second grabbing disk and a cutting disk, each disk having an axis of rotation, said first and second grabbing disks being placed co-axially one above the other and having a spaced apart relationship, the axis of the cutting disk being laterally displaced from the axes of the grabbing disks, the cutting disk being interleaved between the grabbing disks.

19. A vegetable harvester and leaf topper according to Claim 18 wherein the grabbing disks are serrated.

20. A method of handling vegetables comprising:

providing a pair of parallel rollers wherein at least one of said rollers has a vegetable advancing member and both of said rollers have a leaf-engaging member;

feeding vegetables onto the pair of rollers and rotating the rollers counter to each other so that the leaf-engaging members on the rollers move toward each other at a top region of their rotation;

wherein said leaf engaging members engage leaf portions of the vegetables and drag them down between the rollers, with a bulb portions of the vegetables remaining on top of the rollers, so that the vegetables are inverted on the rollers;

advancing the vegetables along the length of the rollers in the inverted position by the advancing member pushing on the bulb portions, while the rollers rotate, in a direction parallel to the axes of the rollers.

21. A method as in Claim 20, further comprising ejecting the vegetables from the pair of rollers so that the vegetables move generally horizontally past a cutting member that separates the leaf portion from the bulb.

22. A method as in Claim 21, wherein said ejecting is done by the advancing member pushing the vegetables generally horizontally off an end of the parallel rollers.